Since writing the above, I have had two samples of green tea sent me which have been offered for sale in London during the past week. One sample is composed of nearly or quite half its weight of the young fruits of the tea-plant about the size of small peas, the remainder being made up of broken tea-leaves agglutinated and rolled together, and enclosing fragments of various matters, mineral as well as vegetable, which, of course, are included for the purpose of increasing its weight and bulk. The other sample consists principally of leaf stalks, a few leaves, rice husks, and the pappus fruits of some Compositæ. Truth compels me to say that all the leaves I have examined out of these samples have been leaves of the true tea-plant, or rather fragments of such, but all artificially coloured, and so superficial is the colouring that it can be easily wiped off with the dry finger. These teas have been offered for sale, one at 1¼*d.* and the other at 1½*d.* per lb., the duty paid on them being equal to that charged on the best teas—namely, 6*d.* per lb.

This class of tea can, of course, only find a sale amongst unscrupulous tradesmen, who buy it to mix with good teas, and where a comparatively small proportion of this rubbish is mixed with a large quantity of good tea, but yet in sufficient bulk to increase the tradesman's profits, it is difficult for the purchaser to detect a few hundred or more such leaves in the thousands which go to form a pound of tea. It is high time there was some regular system of examination of such articles directly they come into port.

J. R. JACKSON

NOTES

PROFESSOR HELMHOLTZ has left Heidelberg for Berlin, to occupy the position left vacant by the death of Magnus, but with the title of Professor of Physiology.

AT the meeting of the French Academy on the 4th inst., Professor Brandt was elected a correspondent of the section of Anatomy and Zoology. In the final election he received twenty-two votes out of thirty-eight, the remaining sixteen being in favour of Mr. Darwin. In the first ballot Professor Huxley received three votes, and M. Loven one.

ONE of the improvements in the management of the Hunterian Museum of the Royal College of Surgeons, introduced by the present Conservator, has been the publication of an annual report of the progress and condition of the collection, and the exhibition in the theatre of the College, of the specimens that have been added to the Museum during each twelvemonth. As the College year ends at Midsummer, this exhibition has just taken place, and has enabled those interested in the Museum to judge of the nature and value of the additions, and the mode in which they have been prepared. The new specimens include fifty-five specimens of pathological anatomy, one hundred and eleven of normal human and comparative anatomy; the latter chiefly prepared from animals which have died in the Zoological Society's Garden, and a considerable series of skeletons and skulls. We propose to refer more fully to Professor Flower's Report on a future occasion.

THE naturalists of Switzerland have decided to form a scientific congress devoted to the study of the natural phenomena of the Swiss Alps, to include the geologists and palæontologists of France, Germany, and Italy, who have paid special attention to this subject, to be held in Geneva on the 31st of August and 1st and 2nd of September, and to be called the Congress of Alpine Geologists. Among the promoters of the congress are Prof. Studer, of Berne; Prof. Mérian, of Bâle; Prof. Escher de la Linth, of Zürich; Prof. Desor, of Neuchâtel; Prof. Favre, of Geneva; Profs. de Loriol, Heer, and Mousson, of Zürich; Prof. Rütimeyer, of Bâle; Prof. Renevier, of Lausanne; Profs. Vogt and Pictet, of Geneva. A committee for the organisation of the congress has been formed at Geneva, with M. Pictet as president, M. Alphonse Favre as vice-president, and MM. Ernest Favre and E. Sarazin as secretaries. All geologists interested in the subject are invited to be at the president's reception on the evening of August 30th, and anyone wishing to communicate any address or paper is requested to write to M. Ernest Favre, 6, Rue des Granges, Geneva.

WE are pleased to hear that the Government of Demerara has re-considered its resolution for discontinuing the geological survey of that colony, and has now resolved to complete it, under the direction of Mr. Charles B. Brown, an associate of the Royal School of Mines.

A SPECIAL extra meeting of the Syro-Egyptian Society of London will be held on Tuesday, July 19, at half-past seven P.M., for the exhibition of a collection of drawings of Egyptian antiquities, by the late R. Hay, F. Arundale, and C. Laver, Esqs. Messrs. Simpson and Bonomi will give explanations.

AT a meeting of the trustees of Owens College, Manchester, held on Thursday, the 7th inst., the vacancy caused by the resignation by Professor W. Jack, M.A. of the Natural Philosophy Professorship, was filled up by the appointment of Dr. Balfour Stewart, F.R.S., superintendent of the Kew Observatory, to the Senior Professorship, and of Mr. James Thomson Bottomley, M.A., F.C.S., Demonstrator and Lecturer in Natural Philosophy in King's College, London, to the Junior Professorship of Natural Philosophy. Dr. Stewart was also appointed Director of the Physical Laboratory which is about to be established in the college. We are informed that Mr. Bottomley has since withdrawn.

M. CLAUDE BERNARD has been elected a member of the Imperial Council of Public Instruction in France for the year 1869-70; M. Briot has been appointed Professor of Mathematical Physics and the calculus of probabilities in the Faculty of Sciences at Paris; and M. Emery, Professor of Geology, Mineralogy, and Botany in the Faculty of Sciences at Dijon.

THE annual public meeting of the Paris Academy of Sciences for the distribution of prizes and rewards, which should have been held in December last, was postponed till the present month, and is now again put off for some unexplained cause.

IT is with great pleasure we hear that the London Institution, in Finsbury Circus, has appointed Mr. John Cargill Brough to the post of Librarian. The library of this Institution is so valuable that it is fitting it should be under the care of a man who combines literary and scientific qualifications in so eminent a degree. It was right that an office once filled by such men as Maltby and Brayley, should have fallen into good hands.

WE understand that Dr. B. H. Paul has been appointed editor of the *Pharmaceutical Journal*, the new series of which we recently announced.

THE list of members of the Institution of Civil Engineers, corrected to July 1, 1870, contains the names and addresses of 16 honorary members, 702 members, 999 associates, and 177 students, making together 1,894 of all classes.

THE House of Commons decided on Friday last that the land belonging to the Thames Embankment shall be kept entirely free from building. The Natural History Museum will therefore occupy the ground already indicated by us on the space adjoining the Royal Horticultural Gardens.

Apropos of this subject, one of our daily contemporaries (and by no means the worst informed on scientific subjects) makes ludicrous blundering. While generously affirming that "any back street will do for a museum," it maintains that "Englishmen cannot fairly be charged with undervaluing Natural History; witness the crowds that throng the great Grecian temple in Bloomsbury, to pause at the cases of stuffed monkeys, and to marvel at the *horns of the megatherium!!*" as indeed well they may. Whether Englishmen can be charged with undervaluing natural history or not, it is clear that newspaper leader writers can be charged with expressing a confident opinion on subjects in which they are unacquainted with the most elementary facts. Clearly there is room for more science teaching.

AT a recent meeting of the Franklin Institute of Philadelphia Professor Morton resigned the office of Resident Secretary, he having received an appointment in a distant city. The resignation was accepted, and the President stated that Professor Morton had consented to continue his charge of the *Journal of the Franklin Institute*, which had achieved so desirable a position under his management. The new position accepted by Professor Morton is that of President of a College of Mechanical Engineering, to be established in Hoboken, opposite New York. He is succeeded at the Institute by Dr. W. H. Wahl.

THE Council of the Institution of Civil Engineers has awarded the following premiums:—1. A Telford Medal and a Telford Premium, in books, to Edward Dobson, Assoc. Inst. C.E., for his Paper on "The Public Works of the Province of Canterbury, New Zealand." 2. A Watt Medal and a Telford Premium, in books, to R. Price Williams, M. Inst. C.E., for his Paper on "The Maintenance and Renewal of Railway Rolling Stock." 3. A Watt Medal and a Telford Premium, in books, to John Thornhill Harrison, M. Inst. C.E., for his Paper on "The Statistics of Railway Income and Expenditure, and their bearing on future Railway Policy and Management." 4. A Telford Medal and a Telford Premium, in books, to John Sopwith, jun., M. Inst. C.E., for his Paper on "The Dressing of Lead Ores." 5. A Telford Medal and a Telford Premium, in books, to James Nicholas Douglass, M. Inst. C.E., for his Paper on "The Wolf Rock Lighthouse." 6. A Watt Medal and a Telford Premium, in books, to George Berkley, M. Inst. C.E., for his "Observations on the Strength of Iron and Steel, and on the Design of parts of Structures which consist of those Materials." 7. A Watt Medal and a Telford Premium, in books (to consist of the second series of the Minutes of Proceedings, vols. xxi. to xxx. inclusive), to Robert Briggs, of Philadelphia, U.S., for his Paper "On the Conditions and the Limits which govern the proportions of Rotary Fans." 8. A Watt Medal and a Telford Premium, in books, to Edward Alfred Cowper, M. Inst. C.E., for his Paper on "Recent Improvements in Regenerative Hot Blast Stoves for Blast Furnaces." 9. A Telford Premium, in books, to John Grantham, M. Inst. C.E., for his Paper "On Ocean Steam Navigation, with a view to its further development." 10. A Telford Premium, in books, to Daniel Makinson Fox, M. Inst. C.E., for his "Description of the Line and Works of the Sao Paulo Railway, in the Empire of Brazil." 11. The Manby Premium, in books, to Emerson Bainbridge, Stud. Inst. C.E., for his Paper on "Coal Mining in Deep Workings." The Council have likewise awarded the following prizes to students of the Institution:—1. A Miller Prize to Robert William Peregrine Birch, Stud. Inst. C.E., for his Paper on "The Disposal of Sewage." 2. A Miller Prize to Henry Thomas Munday, Stud. Inst. C.E., for his Paper on "The Present and the Future of Civil Engineering." 3. A Miller Prize to William Walton Williams, jun., Stud. Inst. C.E., for his Paper on "Roads and Steam Rollers." 4. A Miller Prize to Sidney Preston, Stud. Inst. C.E., for his Paper on "The Manufacture and the Uses of Portland Cement." 5. A Miller Prize to Edward Bazalgette, Stud. Inst. C.E., for his Paper "On Underpinning and making good the Foundations of the Irongate Steam Wharf, St. Katherine's, London." 6. A Miller Prize to Josiah Harding, Stud. Inst. C.E., for his Paper on "The Widening of the Liverpool and Manchester Railway between Liverpool and Huyton, and on the Construction of a Branch Line to St. Helen's." 7. A Miller Prize to the Hon. Philip James Stanhope, Stud. Inst. C.E., for his Paper on "The Metropolitan District Railway."

THE fabled alligator captured in the Thames some months ago has been surpassed by a hippopotamus disporting itself in the Seine. The scarcity of water has been so great in the Jardin des Plantes, that his majesty had been taken by his keepers to the river for his daily bath, securely held, as was thought, by his chain. One day, however, he snapped his chain during his gambols, to the no small dismay of the *blanchisseuses* and steamboat passengers, one lot of whom he threatened to demolish at a mouthful. Several keepers who attempted to board him were treated to a playful ducking, but after the upsetting of a good number of small boats, he was at length captured and hauled ashore. The poor brute must have thought that the good old times of the pre-glacial epoch had returned.

A SPECIAL general meeting of the Fellows of the Royal Geographical Society was held on Monday last at the Royal Institution, Albemarle-street, to consider the question of purchasing a large freehold house for the society's map rooms, library, and offices. The president, Sir Roderick Murchison, explained the necessity for further accommodation, and stated that the Council had at length concluded to purchase the large house No. 1, Savile Row. The meetings, however, would still be held in the great hall of the University of London. The resolution to purchase the property in Savile-row for 14,400*l.* was carried without opposition.

THE Second Report of the King's School Natural History and Natural Science Society, Sherborne, shows the activity with which the study of natural science is followed in the school. As might be expected in so rich a neighbourhood, geology appears to be the branch of science most zealously cultivated.

WE have received the First Annual Report of the American Museum of Natural History. Until 1869 New York was behind Boston, Philadelphia, Washington, and Chicago in possessing no Natural History Museum, a position which a number of gentlemen then determined their city should no longer occupy. Rooms were therefore secured in a building in the Central Park, and large subscriptions were at once collected, and employed in purchasing collections in Europe. Baron Osten-Sacken and other gentlemen also made large donations of specimens and books; and thus, without any assistance from the State except a grant from the duplicate specimens of Natural History belonging to it, the New York Museum of Natural History is in a fair way to become one of the most important on the continent.

THE Natural History Association of Natal has issued its second report. Papers were read during the past session by the Rev. Dr. Callaway, on phenomena occurring among the natives akin to mesmerism, the basis of their faith in divination, in which many interesting and striking facts were brought forward. Mr. Windham's paper on "The Game-birds of Natal," was illustrated by a collection of mounted specimens, chiefly shot by himself, and generally identified by Mr. Layard, whose work on the birds of South Africa forms the recognised authority on the subject. In entomology, valuable papers were read by Mr. H. C. Harford, on the larvæ and pupæ of some Lepidoptera of Natal; by Mr. Morant, Notes of a collecting trip in the Transvaal, during which several new and interesting species were captured; and by Dr. Seaman, on protective resemblances in some local forms of insect life. In botany there are records of a new climbing Scrophulariaceous plant, *Buttonia natalensis*, discovered by Mr. E. Button, and of a new date-palm, detected by Mr. M'Ken, curator of the Natal Botanic Gardens. The colony may be congratulated on possessing so energetic a society.

THE Portuguese Consul-General at Bangkok, a hale man and an excellent swimmer, while bathing in the River Menam, suddenly sank from having come into collision with an electric eel, and was drowned. The Siamese say such deaths are not uncommon.

WE have received from Mr. M. J. Barrington-Ward a syllabus of a course of botanical lectures recently delivered at Clifton College, accompanied by the following gratifying remarks :—"My lectures were attended, I should say, by 100 ladies, and I can well bear out what was said in NATURE a few weeks ago as to the ability which women display at such classes. I never met with so much diligence and real skill in pupils before, and I only wish I could send you some of the papers written by these ladies to show how well and logically they handled a scientific subject."

MR. W. CROOKES has reprinted for private circulation his article in the current number of the *Quarterly Journal of Science* on "Spiritualism viewed by the Light of Modern Science." While admitting that phenomena have come under his notice which seem inexplicable on any known physical laws, the main part of Mr. Crookes's paper is occupied by a statement of the tests to which "Spiritualists" should subject their manifestations, which they have at present failed to do.

"DER rationelle Wiesenbau, dessen Theorie und Praxis," by L. Vincent, an exhaustive treatise on arable agriculture, has now reached its third enlarged edition.

FACTS AND REASONINGS CONCERNING THE HETEROGENOUS EVOLUTION OF LIVING THINGS[*]

III.

THE results at which we have arrived now require to be looked at from two or three different points of view.

In the first place, with regard to these latter experiments, in which, with the help of Dr. Frankland, a perfect vacuum was procured in the experimental flasks previous to their being hermetically sealed, and before the exposure of them and their contained fluids to the temperature of 146 to 153°C. for four hours, it is desirable to know what the influence of such a temperature would be upon fungus-spores and filaments purposely exposed thereto. It is certain that, so far as all experimental observations have gone at present, no fungus-spore has been known to germinate after it has been exposed in a fluid to a temperature of 100°C. for even a few seconds.[†] What then would be the effect of a temperature of 150°C. for four hours? Is it possible that a fungus-spore or a fungus-filament at all similar to those which were met with in the preceding experiments could remain as such—could retain its morphological characters, in fact, after an exposure in fluid to a temperature of 150°C. for four hours? With the view of answering this question, I placed a quantity of a small fungus, consisting of mycelial filaments and multitudes of spores, closely resembling although not quite so delicate as those which were met with in the saline mixtures, into a solution (of the same strength as that which had been previously employed) of tartrate of ammonia and phosphate of soda in distilled water, and then handed it over to Dr. Frankland with the request that he would kindly treat this in the same way as he had done the other four solutions. Accordingly, on May 11, a vacuum having been produced within the flask before it was hermetically sealed, the solution was submitted in the same digester to a temperature of 146° to 153°C. for four hours When taken out from the digester, the previously whitish mass of fungoid filaments and spores had assumed a decidedly brownish colour, and it was in great part converted into mere *débris*. On the following morning the flask was broken, and some of the remains of the fungus and its spores were examined microscopically. *The plant was completely disorganised: not a single entire spore could be found;* they were all broken up into small more or less irregular particles, and the filaments were more or less empty, containing no definite contents, and being only represented by torn tubular fragments of various sizes. This utter disorganisation was in striking contrast with other specimens of the fungus, as it existed before exposure in the digester, which I had mounted in order to retain for purposes of comparison. And from the amount of destructive influence which was exercised upon the microscopic fungus in question, we may fairly imagine that the destructive influence of a similar temperature for four hours upon the still more delicate fungus represented in Fig. 17 would have been by no means less in extent. It would seem, at all events, well-nigh impossible that such a fungus could have pre-existed in the solution before its exposure in the digester, and could afterwards have retained all its morphological characters unimpaired, as they may be seen in the specimen now in my possession, from which the above-mentioned drawing was made. The plant must have been developed, therefore, within the flask itself subsequently to its exposure in the digester. What then could its origin have been? No fungus-spore has hitherto been known to germinate—no previously Living thing has been known to live—after the fluid containing it has been raised to a temperature of 100° C. for a few seconds. The fluid in Experiment 19 had however been raised to a temperature of 146° to 153° C. for four hours. We have even seen, in addition, that such a temperature completely disorganises certain closely allied fungus-spores, so that there is good reason for presuming that it would be similarly destructive to such spores as are represented in Fig. 17 if they had pre-existed in the solution. All that I have just said applies equally to the fungus-spores found in Experiments 18 and 20, and to the Ciliated Monad found in the turnip solution.

For the present, therefore, all presumptions, based upon the best available scientific evidence, are strongly in favour of the *de novo* evolution of these organisms within their respective flasks.

Whilst it seems, however, that the Living things which were found in these four experiments must have been evolved *de novo*, it does not follow necessarily that they were evolved in Experiments 19 and 20 out of the re-arranged elements of the saline substances themselves, because no proof has been offered that these substances were chemically pure. That such *may* have been the origin of these Living things seems, however, to be possible from what I have already said, and will, I think, appear even probable, after a due consideration of some of the facts which are now about to be related.

"Germs" are supposed by many to be universally diffused, more especially in the air and within organic substances. It seemed possible, however, and only reasonable, to suppose that they might exist much less abundantly in saline materials than within organic substances, and this was one reason why such materials were made use of in my later experiments. In order to ascertain whether any visible organisms or spores were to be found in the saline materials employed, portions of these have been repeatedly dissolved by distilled water in a watch-glass, and the fluid has afterwards been submitted to the most careful microscopical examination. Moreover, after sufficient time has been allowed for subsidence, the bottom of the watch-glass has then been most carefully scrutinised by a powerful immersion lens. The saline materials employed in the preceding experiments have been potash-and-ammonia-alum, tartar emetic, phosphate of soda, phosphate of ammonia, oxalate of ammonia, acetate of ammonia, carbonate of ammonia, and tartrate of ammonia. The result of repeated examinations of these substances in the manner above stated, has been that not a trace of anything like an organism—no fungus-spore, germ, or egg of any kind—has been found in solutions of any of the substances employed, except in one. This one in which such bodies have been found is that which I have named last—the neutral tartrate of ammonia.

Several of these salts—the oxalate, the acetate, the carbonate, and the tartrate of ammonia—contain within themselves all the ele-

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[*] (Concluded from p. 201.)

[†] Such a temperature, also, very frequently suffices to produce a considerable amount of disintegration in fungus filaments which are submitted to its influence. It is almost impossible that a perfect organism with a mass of loose spores around it could have braved such a temperature for fifteen minutes, and could then have presented an appearance such as is represented in Fig. 14, the original of which is still in my possession. If not the result of a new evolution, therefore, this fungus must have been developed from a spore which was able to germinate after having been boiled for fifteen minutes; and if so it would be an exception to a rule which has hitherto been found to be general.